

REMARKS

Careful consideration has been given by the applicants to the Examiner's comments and rejection of the claims, as set forth in the outstanding Office Action, and favorable reconsideration and allowance of the application, as amended, is earnestly solicited.

Applicants note the Examiner's rejection of Claims 15 and 17 under 35 U.S.C. §103(a), as being unpatentable over previously cited Colgan, et al., U.S. Patent No. 5,831,710A, in view of newly cited Shigeta, et al., U.S. Patent No. 6,266,121B1 and previously referred to Haven, EP0113064, which was set forth in the Information Disclosure Statement filed in the present application.

Concerning the foregoing, the Examiner extensively discusses the prior art, noting that the primary reference of record, which is Colgan, et al., is applicants' own earlier U.S. patent, commonly assigned to the present applicants and which has already been discussed in extensive detail.

Furthermore, Haven was also extensively discussed previously in specific detail, as presented in response to various Office Actions.

However, upon careful consideration of the art, applicants note that the claims are deemed to clearly distinguish thereover, as amended herein, and as also discussed in view of Nagae, et al., U.S. Patent No. 5,995,190A, as also cited in previous Office Action.

Concerning the foregoing, applicants note that the present invention clearly distinguishes over Colgan, et al., newly cited Shigeta, et al. and Haven in that the present invention provides for a column-like member 28 and a thereto-facing column member 35 to keep and maintain the gap which is present between the substrates, and with each column member being formed on the first and second substrate, respectively, in a separate mode. A minor space, which is formed in the outer wall member 26, 27, is formed at the same time as

the forming of the column-like member 28, and wherein the thereto-facing column member 35 is formed on the opposite or counter substrate, whereby the thereto-facing column member can define a minor space therebetween. The alignment layer, which is also set forth in the claims, clearly covers each of the column-like members 28 and the thereto-facing column member 35. As a result, this structure creates a good liquid crystal alignment around the column-like member 28 in the thereto-facing column member 35. This is not at all anticipated nor suggested in the prior art.

In order to more clearly emphasize the foregoing, the claims have been amended, particularly Claims 15 and 17 and the method Claim 18 in that the column-like structure sets forth "a column-like structure which is formed by a column-member 28 in a facing column member 35, each member being formed on said first or second substrate separately for keeping the gap between said first and second substrates constant, wherein the column member is formed by the same patterning process of said wall-like structure. This particular terminology, which is deemed to clearly and unambiguously define over the prior art, irrespective as to whether the latter is considered singly or in combination, is supported by the specification having reference to the disclosure on Page 16, Lines 16-27, Page 17, Lines 1-12 and Drawings Figures 4(a) and 4(b). None of these particular aspects can be ascertained from the prior art.

Furthermore, with regard to the newly cited reference, Shigeta, et al., U.S. Patent No. 6,266,121, applicants note that the Examiner sets forth that the latter teaches forming LCD comprising the column spacer 54, 64 facing another column spacer (adhesive layer 55, 65) in order to enable a sufficient resistance to impact in desirable and uniform display quality by firmly connecting the upper and lower substrates together. However, Shigeta, et al. only teaches the structure to keep the gap between the upper and lower substrate being formed on

one substrate side only with a polymeric wall 54 and a bonding layer 56. The polymeric wall 54 is a wall-like structure along the lengthwise direction of scanning lines 51a, whereas bonding layer 56, which is formed on the polymeric wall 54 by transferring from the transfer substrate 57, as in Figure 19 (c), whereby this bonding layer 56 functions to "firmly connecting upper and lower substrates together" This is set forth in Column 41, Lines 41-53, Column 42, Lines 57 through Column 43, Line 2 in Shigeta, et al.

Consequently, before laminating the substrate, the structure is formed on one substrate. The alignment layer 53a is not placed on the structure (polymeric wall 54 and bonding layer 56). This structure can readily cause liquid crystal alignment failure or the occurrence of a defect around the structure due to lack of an alignment layer on the surface of the structure.

Nagae, et al. teaches a polymer layer being provided on a resist layer (including a smoothing film) or on ITO (counter substrate) whereby apparently the Examiner considers this layer as the alignment film. However, to the contrary, this polymer layer in Nagae, et al. is created by UV photo-polymerization of a mixture of liquid crystal and photo-polymer and initiator (Column 17, Lines 28-45) and is not an alignment layer but merely a modified polymer wall (or a changed shape thereof).

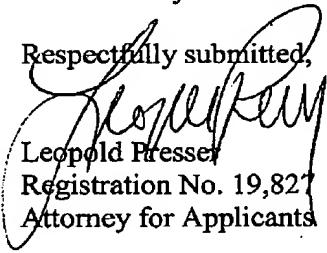
Referring to the previously cited Colgan, et al., the latter teaches a wall segment row 25 similar to a wall-like structure and a post 24 similar to a column-like structure on a single substrate 40, having reference to Figure 2 thereof. In this instance, the wall segment and the post will be the same height and define a gap A between the substrates 1 and 9 in Figure 1 when processed at the same time. Colgan, et al. only teaches a combination of the wall segment and the post, and fails to provide any teaching or suggestion of the key elements as incorporated in the amended claim of the present application.

Haven teaches the provision of a raised ledge 53 and a spacer 54 on a single substrate, wherein the height of the raised ledge is lower than that of the spacer or the gap. For this configuration, there is an extra patterning process in order to form the raised ledge. Haven only teaches the effectiveness of the raised ledge in order to contain the required volume of liquid crystal material; however, fails to teach nor suggest the elements of the polymer structure analogous to that of the present invention, as set forth in the amended claims. Consequently, even combining Colgan, et al. and Haven would not be applicable to the invention, as set forth and claimed herein.

Nagae, et al. merely discloses the application of a photosensitive resin onto a substrate and performing UV exposure for the resin. Even the combination with Colgan, et al. and Haven would not be applicable to the invention as claimed herein.

In view of the foregoing comments and arguments presented in view of the prior art, and the amendment of the claims so as to clearly and unambiguously distinguish thereover, the early and favorable reconsideration thereof by the Examiner and issuance of the Notice of Allowance is earnestly solicited.

However, in the event that the Examiner has any queries concerning the instantly submitted Amendment, applicants' attorney respectfully requests that he be accorded the courtesy of possibly a telephone conference to discuss any matters in need of attention.

Respectfully submitted,  
  
Leopold Presser  
Registration No. 19,821  
Attorney for Applicants

Scully, Scott, Murphy & Presser  
400 Garden City Plaza – Suite 300  
Garden City, New York 11530  
(516) 742-4343

LP:jy